

SKILLMILL

GUIDE FOR USERS AND PRACTITIONERS



IDENTIFY YOUR SKILLS

Identify learning experiences relevant to soft skills development.

UNDERSTAND YOUR SKILLS

Match your personal experiences with professional skills.

EXPRESS YOUR SKILLS

Gather concrete examples of your skills and experiences.

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Authors

University of Helsinki: Sanna Grannas, Anna Storgårds
University of Tartu: Kadri Jurs, Kristel Lään-Saarik
Uppsala University: Björn Nyström, Madelene Rönnerberg, Elias Faltin

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Contact

For anyone interested in the detailed outputs of this project, such as specific phases of the research process or aspects of the findings, the project consortium can provide any additional information required. Please reach us through the e-mail address skillmill@uu.se.

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CHAPTER 1

INTRODUCTION

Soft skills - like problem solving, creativity and leadership - are difficult to teach yet increasingly seen as pivotal for successful employment. Study abroad has proven to be an effective way to train these skills, but recognition in the labour market is not automatic. SkillMill is an app that helps students recognize and understand the skills they gain during study abroad - and express them in employer language.

1.1. Why is SkillMill necessary?

We assume that international study experiences contribute to personal development by providing a diverse environment of new challenges, adaptations and impressions. The Erasmus Impact Study 2014 and 2019 supports this idea after examining the experience of more than 75 000 international alumni, by identifying a significant connection between this personal development and development of essential work life skills, for example communication, critical thinking, problem solving and adaptability.¹

To higher education students and staff, these findings hold a significant implication. Without students necessarily being aware of it, study abroad effectively provides training in a specific type of professional skills that employers are actively looking for - but that are also generally difficult to recognise and measure. Diverse labour market-oriented organisations, from OECD and World Economic Forum to LinkedIn, recognize that soft skills constitute a significant benefit for people looking to enter the labour market or advance their careers.

The rationale behind this reasoning is that soft skills are not only seen as valuable skills in themselves. They influence to a high degree how well we apply our technical skills in a dynamic and sometimes unpredictable work environment. As such, while specific technical skills requirements change with technological advances and sectoral needs, the relevance for soft skills appears to be stable over time.² If anything, the rapid changes in work environment and needs following the COVID-19 pandemic have only highlighted an increased global need for adaptable, communicative, creative, resilient and responsive workers. This factor makes soft skills an important resource for employers and employees alike.

In a 2019 LinkedIn study of 5000 employers, 92% stated that soft skills matter as much - or more - than hard skills when they hire, calling soft skills something that “*can make or break a hire*”. However, the report also echoes the inherent elusiveness of these skills by calling them something that “*everyone wants - but no one knows how to find*”.³

As such, study abroad - and its subsequent soft skills gains - should provide a significant employability edge for mobile students. But despite offering training in skills increasingly sought after by the labour market, international mobility is not universally - nor automatically - regarded as a soft skills training merit. The reason is simple, and summarised by the Finnish National Agency for Education (2014): Employers do not draw an equal sign between study

¹ European Commission, Directorate-General for Education, Youth, Sport and Culture, (2019). Erasmus+ higher education impact study : final report, Publications Office.
<https://data.europa.eu/doi/10.2766/162060>

² 2019 Global Talent Trends, the 4 trends transforming your workplace. LinkedIn. Retrieved 29 Aug 2022 from <https://app.box.com/s/c5scskbsz9q6lb0hqb7euqeb4fr8m0bl/file/388525098383>.

³ Anderson, B. M. (2020, January 9). The Most In-Demand Hard and Soft Skills of 2020 [Review of The Most In-Demand Hard and Soft Skills of 2020]. LinkedIn Talent Blog. Retrieved June 28, 2022, from [https://www.linkedin.com/business/talent/blog/talent-strategy/linkedin-most-in-demand-hard-and-soft-s](https://www.linkedin.com/business/talent/blog/talent-strategy/linkedin-most-in-demand-hard-and-soft-skills) kills

abroad and possession of key non-technical skills.⁴ The burden of proof therefore often falls on the student, who is required to clearly describe how the learning outcomes of study abroad can benefit an employer's organisation. This requires not only a great deal of self-awareness, but also a familiarity with the wide range of soft skills that exist - and why they matter to employers in the workplace context. Importantly, the need for skills-awareness does not end with successfully achieving one's first employment. As soft skills continue to develop throughout one's professional life, so continues the need to understand and verbalise their meaning and professional uses in order to fully benefit from them.

This dynamic is recognised by the European Union, as seen in the European Skills Agenda for 2025:

"While schools have a role to play, soft skills are often developed outside formal learning, at work and throughout life. It can be difficult to identify, recognize and communicate those skills. This is why in the next phase of EU action on soft skills, more needs to be done to capture them."⁵

SkillMill responds to this call to action, by empowering students to recognise, understand and verbalise the relevance of soft skills for achieving balance with new or unfamiliar surroundings. For example in international experiences from study abroad, internships and field studies. We hope that by using the SkillMill app, students will develop a skills identification habit which can help them address changing skill demands in the world of work.

1.2. What is SkillMill?

SkillMill bridges international studies and employability by helping users translate relevant international experiences into soft skills learning experiences. This is done by reflecting on meaningful events in student mobility, internships, field studies and internationalisation at home, and connecting them to relevant soft skills. In the process of bringing their hidden skills to light, users build a journal of experiences and skills that can provide both greater self-confidence and concrete advantages in the transition from studies into professional life.

SkillMill is a digital, pedagogical resource in the format of a mobile app that makes complex learning resources accessible to students. This is done by adapting resources such as established skills taxonomies (e.g. WEF, UNESCO, OECD, ESCO) and career counselling methods into a game design framework, available in student's phones before, during and after international learning experiences. This way, SkillMill aims to provide users with a safe and personal step-by-step reflection process, which helps them connect personal experiences

⁴ CIMO [The Centre for International Mobility]. (2014). Hidden competences. Faktaa. Facts and Figures, 1. Retrieved June 28, 2022, from

https://www.oph.fi/sites/default/files/documents/32427_faktaa_1_2014_hidden_competences.pdf

⁵ European Commission. New Skills Agenda for Europe - Employment, Social Affairs & Inclusion (n.d.). Ec.europa.eu. Retrieved June 28, 2022, from

<https://ec.europa.eu/social/main.jsp?catId=1223&langId=en>

with labour market skills and employer perspectives.

SkillMill prioritises personal empowerment, through awareness of one's capabilities and understanding of employer perspectives, over quantitative measuring of soft skills. By aiding in the discovery of meaningful learning even in challenging experiences, SkillMill encourages students to be mindful of the value of diverse experiences within and outside of the classroom. This can be particularly important for students in times of change and life transitions, or when actively stepping outside their comfort zone.

CHAPTER 2

THEORETICAL FRAMEWORK

SkillMill stands on three pillars: Consolidating established soft skills frameworks and making them more accessible for students; placing the skills into a counselling framework consisting of reflection questions based on experiential learning, and integrating these skills and reflection questions into a pedagogic environment based on game design theory.

2.1. Soft Skills

In aiming to create a list of soft skills relevant to the employability of students in higher education, we reviewed several international studies on soft skills relating to employability and students' study abroad experiences. As a result, we selected six research reports^{6 7 8 9 10 11} and produced a list of the "Big Nine Soft Skills in demand for Employers" based on the findings of those reports (Figure 1). By analysing and combining different theoretical frameworks and the collective professional experience of our group of counsellors and psychologists, we created a unique and student-centred framework for the SkillMill project,



Figure 1: The "Big9" skill categories

⁶ Ulisse - Soft Skills for Employability (2020). Soft Skills Lexicon [Review of Soft Skills Lexicon]. ULISSE Consortium Parties. Retrieved June 28, 2022, from <https://ulisseproject.eu/wp-content/uploads/2019/09/Soft-Skill-Lexicon.pdf>

⁷ Janus+ (2018). Final list of soft skills for trainees - Learning and assessing soft transversal skills in work-linked trainings to optimize the success of pathways, to prevent from dropouts and to favor employment integration and professional mobility in the long term EU -project. Retrieved June 28, 2022, from

<https://ec.europa.eu/programmes/erasmus-plus/project-result-content/b61f5203-b18d-44b9-a5b5-c674fa09e2a1/FINAL%20LIST%20OF%20SOFT%20SKILLS%20FOR%20EVALUATION-TRAINEES.pdf>

⁸ Anderson, B. M. (2020, January 9). The Most In-Demand Hard and Soft Skills of 2020 [Review of The Most In-Demand Hard and Soft Skills of 2020]. LinkedIn Talent Blog. Retrieved June 28, 2022, from <https://www.linkedin.com/business/talent/blog/talent-strategy/linkedin-most-in-demand-hard-and-soft-skills>

⁹ Mossa: The Model of Soft Skills Assessment (2016). The Evaluation of Soft Skills of Medium-high Skilled Migrants. [Review of The Evaluation of Soft Skills of Medium-high Skilled Migrants.]. Valorize high skilled migrants - VHSM consortium. Retrieved June 28, 2022, from <http://valorize.odl.org/outputs/IO2%20-%20MOSSA%20VHSM.pdf>

¹⁰ OECD Competency Framework, Talent.oecd - Learn. Perform. Succeed. (2018). Retrieved June 28, 2022, from https://www.oecd.org/careers/competency_framework_en.pdf

¹¹ European Commission, Directorate-General for Education, Youth, Sport and Culture, (2019). Erasmus+ higher education impact study : final report, Publications Office.

<https://data.europa.eu/doi/10.2766/162060> Retrieved June 28, 2022

<https://op.europa.eu/en/publication-detail/-/publication/94d97f5c-7ae2-11e9-9f05-01aa75ed71a1>

consisting of 68 associated concrete sub-skills tied to the nine main categories (“The Big9”) of soft skills.^{12 13 14 15 16 17 18 19 20 21}

By cross-referencing the Big9 with the newly released skills framework by The World Economic Forum,²² which in turn builds on the European Skills/Competences, Qualifications and Occupations (ESCO) framework²³ as well as the Occupational Information Network (O*NET) framework,²⁴ and identifying differences and overlaps, we were able to consolidate the Big9 list of skills as representative of the skills seen as important in today’s global labour market. As such, even if the SkillMill soft skills taxonomy is unique for this project, it is a functional and up-to-date combination of several established frameworks. The complete list of the Big9 and their sub-skills can be found in Appendix 1: The Big9 Skills Framework.

To ensure compatibility between the Big9 soft skills and contemporary language used in the recruitment of new employees, we analysed ways in which skills requirements were expressed in a random selection of job ads published in Sweden, Finland and Estonia. We furthermore interviewed employers as a means of stakeholder-based quality assurance to consolidate a list of soft skills they perceive to be vital to their recruitment processes. The conclusion from this analysis was that the Big9 and the sub-skills were indeed both present and recognised in current job ads and employer mindsets in the Nordic countries.

¹² Mitchell, K. E., Levin, A. S., & Krumboltz, J. D. (1999). Planned happenstance: Constructing unexpected career opportunities. *Journal of Counseling & Development*, 77(2), 115-124. <https://doi.org/10.1002/j.1556-6676.1999.tb02431.x>

¹³ Savickas, M. L. (2005). The Theory and Practice of Career Construction. In S. D. Brown & R. W. Lent (Eds.), *Career development and counseling: Putting theory and research to work* (pp. 42-70). John Wiley & Sons, Inc.

¹⁴ Peavy, R. V. (2000). A Sociodynamic Perspective for Counselling. *Australian Journal of Career Development*, 9(1), 17-24. <https://doi.org/10.1177/103841620000900105> Retrieved June 28, 2022, from http://www.sociodynamic-constructivist-counselling.com/documents/brief_outline.pdf

¹⁵ Foundation Innove. (2017). Supporting Career Development Competencies (M. Lehtsalu, Ed.; p. 13) [Review of Supporting Career Development Competencies]. Foundation Innove. Retrieved from https://harno.ee/sites/default/files/documents/2021-02/KOM_kirjeldus_29_12_2017-2.pdf

¹⁶ Tomlinson, M. (2017). Forms of graduate capital and their relationship to graduate employability. *Education and Training*, 59 (4), 338-352. doi:10.1108/ET-05-2016-0090

¹⁷ Poehnell, G. & Amundson, N. E. (2011). *Hope-filled engagement : creating new possibilities in life/career counselling*. Ergon Communications.

¹⁸ Bloom, B. S. (1956). *Taxonomy of Educational Objectives: The Classification of Educational goals. Handbook 1, Cognitive Domain*. Longman.

¹⁹ Kolb, D. A., & Fry, R. E. (1975). Towards an applied theory of experiential learning [Review of Towards an applied theory of experiential learning]. In C. L. Cooper (Ed.), *Theories of group processes* (pp. 33-58) Wiley.

²⁰ Kernbach, S. (2018). *Storytelling Canvas: A Visual Framework for Developing and Delivering Resonating Stories*. 2018 22nd International Conference Information Visualisation (IV). <https://doi.org/10.1109/iv.2018.00073> Retrieved June 28, 2022, from https://www.researchgate.net/publication/329480216_Storytelling_Canvas_A_Visual_Framework_for_Developing_and_Delivering_Resonating_Stories

²¹ Yates, J. (2019). *The career coaching toolkit*. London Routledge

²² Skills Taxonomy. (n.d.). *Reskilling Revolution - World Economic Forum*. Retrieved June 28, 2022, from <https://www.reskillingrevolution2030.org/reskillingrevolution/insights/skills-taxonomy/index.html>

²³ The ESCO Classification - Skills & Competencies. (n.d.). esco.ec.europa.eu. Retrieved June 28, 2022, from <https://esco.ec.europa.eu/en/classification>

²⁴ O*Net Resource Centre, The O*NET® Content Model. Retrieved August 28, 2022, from <https://www.onetcenter.org/content.html>.

2.2. Counselling

Learning from previous experience is the foundation that allows us to create a new knowledge about ourselves, by expanding the whole spectrum of self-awareness.

To build a framework for soft skills identification, we analysed the career guidance process that counsellors use in their everyday work. This formalised model can be seen in Figure 2. In career counselling, the analysis of previous experiences through storytelling and personal narratives is a common means to identify skills and competencies gained.

According to Kolb's learning cycle²⁵ - a simple model which supports reflection and understanding of experiences - effective learning is achieved through four stages:

1. **Concrete experience:** Recognising a concrete experience;
2. **Reflective observation:** Observing and reflecting on that experience;
3. **Abstract conceptualisation:** Analysing and making abstract conclusions;
4. **Active experimentation:** Testing and applying the knowledge and conclusions in new experiences.

While it may be difficult for students to instinctively know which skills they have exhibited and when they may have done so, we often find that starting from the story perspective can help students approach their own experiences in regards to different skills, by looking at concrete behaviours in the past.

To further support this process, each skill in the Big9 framework is coupled with reflection questions that can help students identify concrete experiences in which they may have exhibited this skill. This is in line with the career counselling process, in which we often use questions to support students in opening up their experiences. In the app, reflective questions provide an intuitive way to guide users through self-reflection processes based on Kolb's learning cycle. Such questions can be general (e.g. "Can you remember a time when things didn't go as you expected?") or specific (e.g. "Think of a time when teamwork really made a difference"). Furthermore, in the app, increasingly specific questions help the students hone in on potentially relevant applications of different skills, which can be reflected deeper on in subsequent exercises. For example "Did you accept that some things were different or strange to you, without trying to change them?" (connected to Adaptability & Flexibility; Accepting difference) or "Did you take a leading role, e.g. by providing instructions or directions?" (connected to Teamwork & Leadership; Leading and coordinating).

²⁵ Kolb, D. A., & Fry, R. E. (1975). Towards an applied theory of experiential learning [Review of Towards an applied theory of experiential learning]. In C. L. Cooper (Ed.), *Theories of group processes* (pp. 33-58) Wiley.



Figure 2: Career guidance process

However, as detailed in the introductory chapter, a key factor for employability is not only the awareness of one's skills, but also the ability to verbalise and express them.²⁶ To help students structure narratives of study abroad experiences, we selected the CAR (Context, Action, Result) model as a technique for storytelling (figure 3). CAR (Context, Action, Result), sometimes further elaborated as the STAR (situation, task, action, result) model, is a widely used and established technique within the field of counselling, and is used to structure stories that provide proof of real-life application of relevant skills. For example in interview preparation and cover letter writing. The model is concrete and easy to understand, and does not require extensive instructions for users to follow effectively.

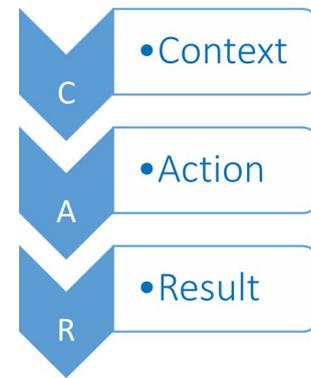


Figure 3: The CAR model

Based on these selected career counselling methods, the SkillMill framework provides a pathway for users to begin understanding and expressing their soft skills in the employer language through the SkillMill app.

²⁶ CIMO [The Centre for International Mobility]. (2014). Hidden competences. Faktaa. Facts and Figures, 1. Retrieved June 28, 2022, from https://www.oph.fi/sites/default/files/documents/32427_faktaa_1_2014_hidden_competences.pdf

2.3. Game Design

In the SkillMill app's design process, a key aim was to 'meet students and users where they are' (both in terms of life situation and level of knowledge) and be a companion on their personal development journeys. In short, to empower future reflection and learning rather than measure a current state. Here, the academic field of Game Design offers distinct advantages.

A game needs to teach the user how to interact with it, without any teacher or designer ever being in the same room as the user. As such, modern games contain very intentional guidance processes, and build on pedagogic approaches that embrace curiosity and exploration. Furthermore, Game Design as an academic field looks critically at the medium, striving to avoid harmful design and interaction patterns and consciously choose ones that have the user's best interest in mind.²⁷

Games as an interactive medium can thus guide interaction over time through a variety of audiovisual cues, and unwrap a learning or reflection process incrementally by providing information step-by-step to the user. Finally, in terms of accessibility, a personal reflection space in a digital medium can still be provided to numerous and diverse groups of students simultaneously.

Based on the three key issues specified in the European Skills Agenda for 2025 (to identify, understand and express²⁸ soft skills development), SkillMill's digital design team set out to:

- Provide a step-by-step introduction to the "Big9" framework's nine skill categories and 68 different sub-skills;
- Pair it with guided reflection pathways that allow users to find connections between personal experiences and skills, as well as introduce methods to express the insights in ways relevant to a recruitment context, and
- Provide attractive and rewarding ways to gather the resulting stories, making them interesting to return to.

This mission was formalised into the following specific design challenges:

Identify:

- How to encourage the seeing of diverse challenges and experiences during study abroad as skills training and learning experiences, in order to start reflecting on them?
- How to enable journaling of diverse experiences without requiring long text input, in order to keep track of diverse experiences?

²⁷ Zagal, J.P., Björk, S. & Lewis, C., (2013) Dark Patterns in the Design of Games. Software institutes' Online Digital Archive. Retrieved August 28, 2022, from <https://core.ac.uk/download/pdf/301007767.pdf>.

²⁸ European Commission. New Skills Agenda for Europe - Employment, Social Affairs & Inclusion (n.d.). Ec.europa.eu. Retrieved June 28, 2022, from <https://ec.europa.eu/social/main.jsp?catId=1223&langId=en>

- How to encourage broad exploration of different skills perspectives, in order to find diverse connections?

Understand:

- Help students narrow down the soft skills associated with their experience to identify the most relevant and important ones.
- How to introduce the vast amount of different skills inventories to students in an accessible way, in order to make them easy to understand and navigate?

Express:

- How to help users verbalise insights in a narrative storytelling format, suitable to recruitment contexts?
- How to help users collect these verbalised insights, in order to help them see patterns across different and diverse experiences?

These challenges are subsequently addressed in the SkillMill app's three different play modes: Exploration, Insight and Verbalisation. Detailed information about these modes is presented in chapter 3.2. How to use the SkillMill app.

Visual interface: In the metaphoric language of SkillMill, the mill symbolises the process of refining past experiences into conscious merits, with the wind symbolising the self-reflection that drives this process. Building on this foundation, SkillMill's graphic design student has created a colour palette that provides a sense of friendliness and comfort, encouraging a view of reflection as safe, explorative and relaxing. The main colours blue and orange symbolise open skies and fields, to give a sense of being outdoors where one can self-reflect without any distractions. Since the app contains a multitude of steps, exercises and information, using a limited amount of colours helps to keep the app easy to navigate without becoming overwhelmed.

Figure 4 below shows parts of this process, featuring early sketches and mood boards based on existing designs and describing general aims, followed by mockups and iterative designs leading to the final SkillMill visual identity.

Finally, rather than seeking out existing and culture-specific symbols for abstract skills such as creativity and problem-solving, SkillMill chose to design new, abstract, symbols that are culturally neutral and open for personal interpretation. As a result, a set of nine unique images was created to symbolise the Big9 skill categories (see p. 9).

Data protection and GDPR: The SkillMill app uses only local storage. No personal data is visible or transferable between different users, nor visible to the developers. Users can choose to let SkillMill collect anonymous diagnostics and usage data to help improve technical performance and the design of the app, although this is completely voluntary. Users can choose to opt-out from this at any time, and can request the deletion of their data.



Figure 4: Examples from the graphic design process

CHAPTER 3

USING AND IMPLEMENTING SKILLMILL

SkillMill is designed to support soft skills reflection before, during and after study abroad experiences. But it is equally useful in internships, field studies, internationalisation at home and promotion of lifelong learning.

It can be used individually, in groups and in workshop settings.

3.1. Who is the SkillMill app for?

Introduction

The SkillMill app can be used anytime, but it is particularly beneficial for higher education students in conjunction with study abroad or other international study experiences. The app can be introduced to students through various communication channels such as e-mail, information sessions, mobility portals and study abroad websites. To gain most from the guidance that the app provides, the students should be introduced to the app before mobility and together with information about the labour market benefits of soft skills, as well as reminded to use it during their international experiences. We also recommend that mobility staff and career counsellors work together in reflective unwrapping workshops after the study abroad period. Following these steps will bring light on the career skills that the student has been identifying, and verbalising in the app, during the mobility.

Study Abroad Offices

For study abroad offices, the SkillMill app provides a new way to introduce dimensions of concrete employability benefits in the marketing of study abroad opportunities. In this context, potential challenges in study abroad can be reframed as training in relevant labour market skills, which may provide an ‘edge’ in post-graduation job-hunting. Especially for risk-averse students, to whom studies in a foreign and unfamiliar context may seem like a “gamble” with unsure academic or professional benefits compared to staying at their alma mater, this narrative may mitigate doubts and constitute a unique ‘selling point’ for studies abroad.

Career Services

For career services, the SkillMill app can be used as a tool to encourage reflection on skills. Not only in the context of study abroad, but for any experience where students have stepped outside their comfort zone, such as in internationalisation at home, field studies or internships - or as a first-year student new to the higher education context. The app can be introduced to students e.g. during an individual counselling session, in small group activities or in a workshop context. After a student has started the exploration and reflection process using the app, the counsellor and student can also discuss the results together.

Lifelong learning

In addition to concrete insights, the SkillMill app aims to nurture a reflective mindset and a skills-oriented language, both of which can follow students beyond the immediate university context. Once a student or user has gotten used to seeing new experiences as learning-opportunities (for both new knowledge and skills), the same logic may apply to experiences in professional or private life beyond graduation as well. As such, SkillMill encourages a lifelong learning mindset, in which one’s personal skill set is under constant and continuous development.

3.2. How to use the SkillMill app

To place the theoretical framework in an interactive learning environment, SkillMill's development team has established a user-flow divided into six parts, each aiding different steps in the user's reflection journey.

- **Path selection:** Allows users to focus on either looking for experiences that match a specific skill, or exploring a specific experience for different skills.
- **Exploration:** Presents users with reflection questions that help them both choose an experience to reflect on, as well as explore their behaviours in the chosen experience from the perspective of different skills and sub-skills.
- **Insight:** Presents the user with information about various skills based on results from the exploration exercises, helping them to narrow down a selection of skills relevant to their experience.
- **Verbalisation:** Introduces storytelling methods to help the user narrativize their experience and learning outcomes into a short story.
- **Emoji Canvas:** Helps the user create a visual diary entry of their experience, both aiding reflection and making it easier to remember in the future.
- **Story Book and Encyclopaedia:** Collects the user's stories and emoji canvases under each Big9 skill category to help them gather their insights and, in time, empower them to see patterns in their personal development.

Open Path and Guided Path: Each of these two modes serves a distinct purpose. Open Path (symbolised by a paper plane) lets users pick a personal experience (e.g. from studies abroad) and explore it for potentially relevant skills from all Big9 skill categories. Guided Path, on the other hand, helps users begin from a specific Big9 skill (e.g. communication or problem solving) and reflect on previous experiences that may be relevant to its respective sub-skills (Figure 5).

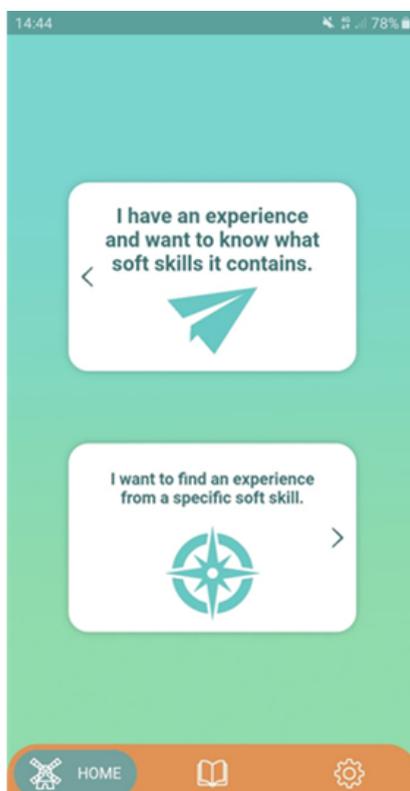


Figure 5: Path selection

Users can approach both paths with a specific experience in mind. For cases when no particular experience comes to mind, the app also provides a number of reflection ques that can help a user find a good experience to start with (Figure 6). Either open-ended questions, such as “Think of a time when you rose to meet a challenge”, which is applicable to many skills and experiences. Or more narrow, e.g. “Think of a time when you presented in front of a crowd”, which can direct a user towards more specific experiences.

In order to start the process of elevating the chosen event to a learning experience, users are asked to name it. This step relates to step 1 of Kolb’s Learning Cycle (“Concrete experience”).

Exploration: Since it may be difficult to know instinctively which of the numerous possible skills that were relevant in a certain situation, the “Exploration” mode helps users narrow down the selection before going into more detailed reflection. This exercise lets users start from their own perspective, with focus on how they acted in their chosen situation. Here, users reply “yes” or “no” to questions such as:

- Did you ask questions to make sure you really understood a situation or a person?
- Did you choose to focus on finding solutions rather than getting stuck just focusing on the problem?
- Were you able to adapt your communication to cultural or personal differences?

The aim of this exercise is to reflect on one’s own behaviour and look at one’s experience from many different perspectives, and corresponds to step two in Kolb’s learning cycle (“Reflective observation”).

The Guided Path provides questions relevant only to the pre-selected skill (e.g. communication skills) while the Open Path provides a random selection from all Big9 skill categories.²⁹ This path requires the Exploration exercise to be carried out two additional times, each time asking the user to choose three skill categories on which to focus on more (Figure 7). This is meant to encourage an initial reflection on the different meanings of the Big9 skill categories, and how they relate to one’s chosen experience. While the user is still shown questions relating to all skill categories, the exercise contains a greater number from the chosen categories. The colored background of the buttons shows how many sub-skills of each category the user has explored questions relating to.

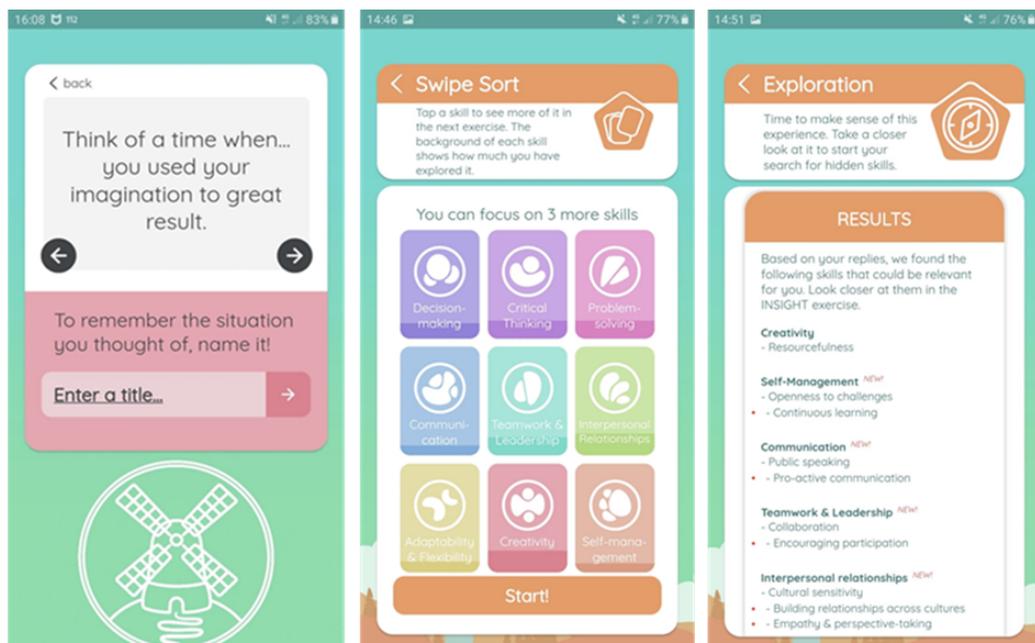


Figure 6: Reflection que; Exploration skill category selection, and Exploration exercise results

²⁹ I.e. Decision making, Critical Thinking, Problem solving, Communication, Teamwork, Interpersonal relationships, Adaptability & flexibility, Self-management, and Creativity.

Insight: Based on the questions that the user answered “yes” to in the Exploration exercises, the SkillMill app filters out a number of sub-skills that may have relevance to the user’s experience. This provides a starting point from which to look closer at these sub-skills, together with descriptions of what they mean. Being able to keep only a maximum of three sub-skills when moving on to the “Verbalisation” exercise, users are encouraged to read about and think closer on the skills, in order to find the ones they feel speak most to them and their chosen experience. Ultimately, users end up with one “top” sub-skill and two “runner-ups” on which to focus in the subsequent exercise.

The aim is not only to realise which skills feel most relevant to their experience, but also to realise that many skills may in fact be relevant, but to different degrees.

Verbalisation: Following the narrowing-down of sub-skills that feel relevant to the user’s chosen experience, the Verbalisation mode introduces the CAR storytelling model, described in Chapter 2.2. With the input already gathered, the app gives the user a short skeleton of a story:

[Situation name] provided experience in [Big9] skills, such as [sub skill].

For example: “*Visa application provided experience in Critical Thinking skills, such as Information literacy*”.

Introduced to the CAR storytelling model, the user is now encouraged to explain the context (what happened), their actions (how they reacted), and the result (how the situation provided experience with the selected skill).

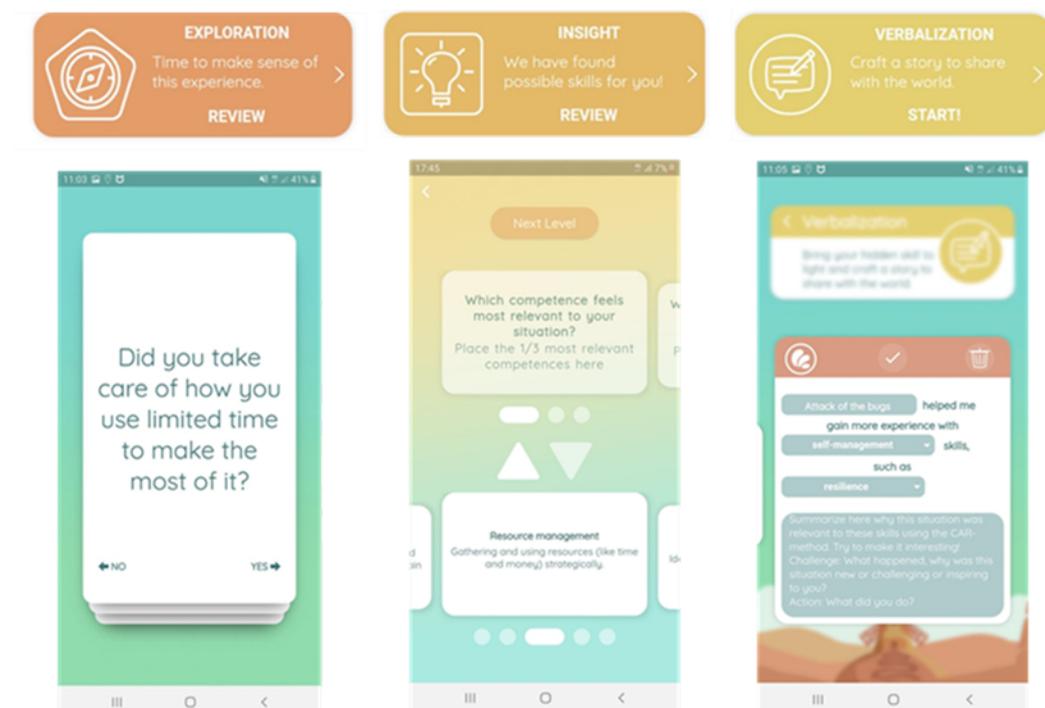


Figure 7: Examples of Exploration, Insight and Verbalisation exercises

For example: *“When I studied abroad, the visa application proved quite long and complicated. However, I was very careful when reading the instructions, and approached it in a very detail-oriented way, leading to a smooth and frictionless application. This provided good experience with critical thinking skills, such as information literacy”.*

Together, the Insight and Verbalisation modes correspond to the third step of Kolb’s learning cycle (“Abstract Conceptualisation”).

Emoji Canvas: Repeated focus groups³⁰ with higher education students and staff highlighted the fact that study abroad as a whole contains a multitude of diverse experiences that are difficult to keep track of without help. At the same time, text-based journaling was seen as time-consuming and something best saved for when users have concrete insights, which they actively may wish to document. This led to the design of a journaling function emphasising effectiveness and without the need for writing long texts: A visual journal. To this end, the game design team chose emojis as a visual symbol library, as something already in use by billions of culturally diverse students across the world. Emojis’ meanings are immediately recognisable, while at the same time flexible and subject to creativity and playfulness. The resulting “Emoji Canvas” lets users reflect freely on experiences by illustrating them with emojis that can be resized, annotated, rotated and stacked to create new and unique meanings. This exercise leads to a visual manifestation of an experience, the creation of which can serve as a form of open-ended reflection in itself.

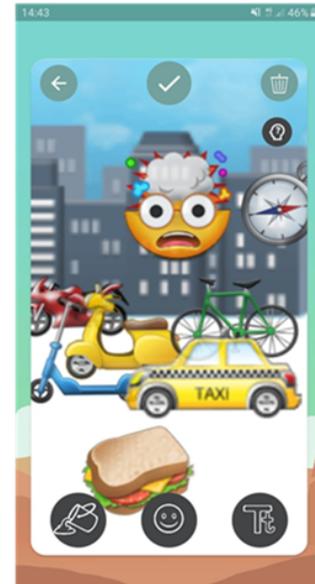


Figure 8: Emoji canvas

Story book & Encyclopaedia: All completed stories and emoji canvases are collected in the app’s “Story book”. Sorted under each Big9 skill category, the user is encouraged to see that the same skill (e.g. Communication) can be present in many different situations, while still recognising that the same skill has many different expressions or sub-skills (ranging from e.g. active listening to negotiation).

Lastly, each skill section in the Story Book provides a mini-encyclopaedia, giving the user access to all of SkillMill’s collected skills and sub-skills, together with pedagogic explanations. In order to provide an employer perspective, the encyclopaedia also provides explanations of why each Big9 skill is valued by employers, as well as examples of how interview questions could be formulated to probe for that specific skill.

³⁰ In collaboration with EIT Health, SkillMill carried out challenge-based training opportunities called iDays. At these digital events, students and staff were welcomed to address SkillMill’s various design challenges while practising a design thinking methodology introduced by EIT Health staff.

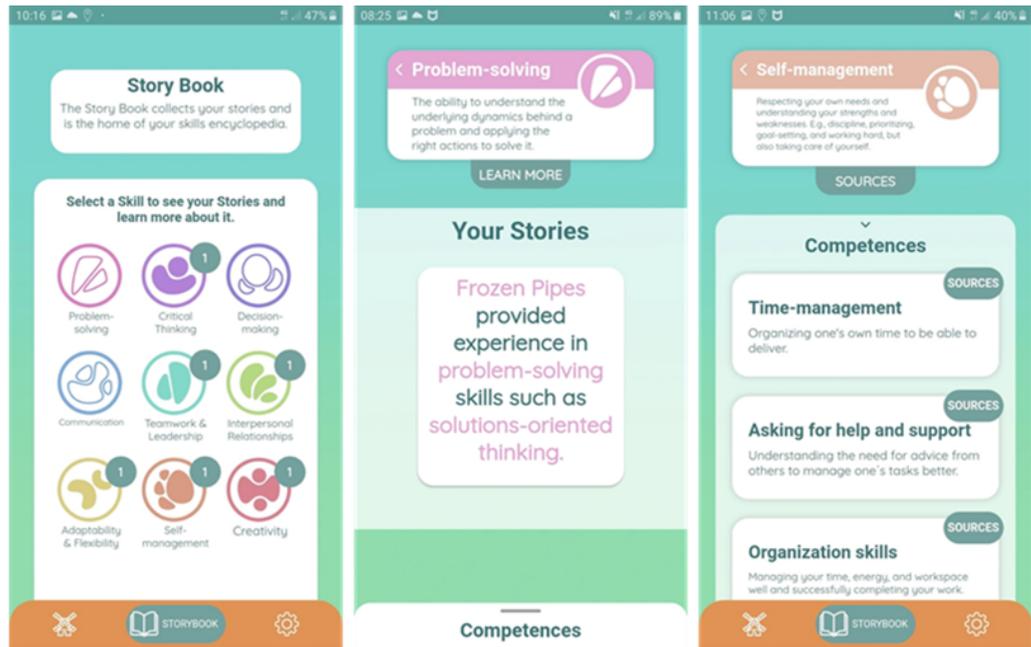


Figure 9: Story Book, saved story example, and skills encyclopaedia

Examples of user journeys: In the two illustrations on the following pages, we show a hypothetical reflection path through the Open Flow and the Guided Flow, to visualise how the app may guide a user’s reflection (Figure 10, Figure 11).

9. STORY BOOK: This story is saved into Robin's Story Book under Adaptability & Flexibility, where he keeps all the skill stories he gathers during his time in Japan. This feature also works as a skills encyclopedia, where he can learn more about different skills and why employers seek them.

8. VERBALISATION: Moving on to the verbalisation exercise, Robin is presented with a short story skeleton. "Summer crisis provided experience in Adaptability and Flexibility skills such as Learning from experience". SkillMill then introduces the CAR storytelling model (Context - Action - Result) and asks him to verbalize how "Summer Crisis" helped him gain experience with this skill. He writes:

When I studied in Japan, the hot and humid summer climate came as a big surprise. Before I knew it, I had both mold and big cockroaches in my apartment! Luckily, I consulted Japanese friends who helped me understand how to both store food in order to not attract insects, as well as how to manage room humidity better. This provided good experience with Adaptability skills such as Learning from experience, since I am now much better equipped to manage in tropical climates.

7. INSIGHT: Robin realizes that several skills were in fact relevant to this situation. By being asked to pick the **three most relevant** skills, he starts comparing them and reflect on what feels closest to his experience. He settles on A) Active listening, B) Learning from experience, and C) Solutions-oriented thinking.

Being asked to pick his number one favorite, he chooses Learning from experience from the Adaptability and Flexibility category, since he is certain he will handle the tropical climate differently from now on.

6. NEW PERSPECTIVES: Based on his replies, the SkillMill database finds associated soft skills from skills frameworks such as OECD, WEF, ESCO and LinkedIn. Robin goes to the 'Insight' exercises to look closer at these skills to see which might have been relevant for him. Here he is presented with both their names and short explanations of what they mean.

SkillMill User Journey 1: Climate in Japan

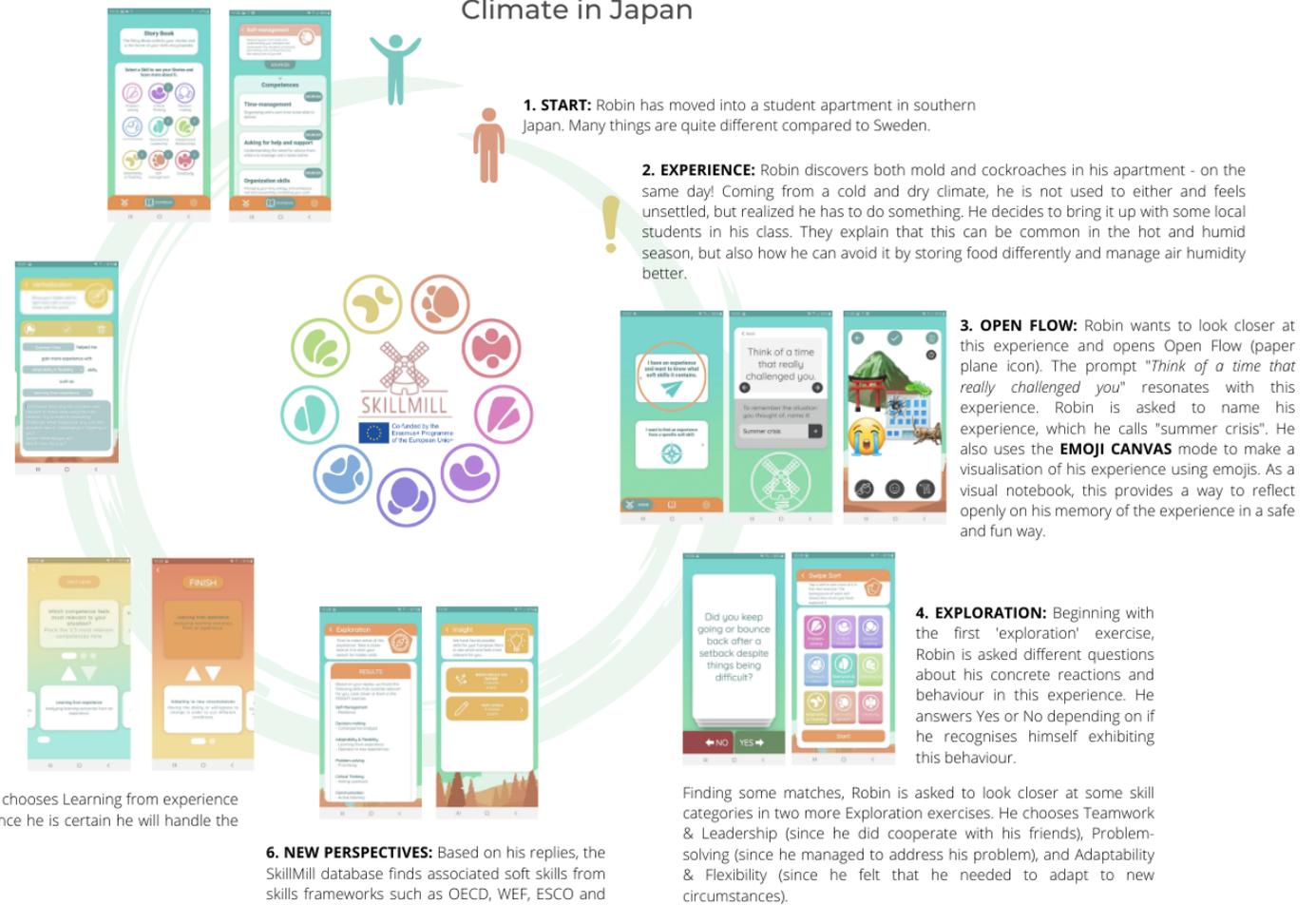


Figure 10: Open flow example

SkillMill User Journey 2: Diplomacy in France



Figure 11: Closed flow example

3.3. How to use the app in a group context

According to our experiences, peer support (i.e. when students meet in groups), can work as a catalyst for the skills identification process.

Below you will find two suggested structures for reflective workshops that feature the SkillMill app. We suggest that these workshops are conducted by career counsellors, other trained counsellors or staff experienced in conducting group activities.

Workshop agendas

Both workshop options begin with an Introduction to soft skills. This introduction should contain information such as:

- What are soft skills? When are they trained?
- Why are they important in life?
- Employers' perspectives on soft skills; what are employers looking for in recruitment?
- How can we unwrap our soft skills? And how can we verbalise our skill sets to employers so they understand what we have to offer?

Workshop option 1) Life line exercise to introduce soft skills reflection

This is a warm up introduction to soft skills, and is well-suited for times when there is a limited time to meet a group of students **before their study abroad experience**.

Individual reflection:

- Provide a blank sheet to the students or ask them to use their laptops.
- Ask them to draw a timeline representing their life and mark times when they have stepped outside their comfort zone. For example:
 - moving to a new place,
 - collaborating with new people,
 - starting a new job or studies,
 - travelling or living abroad,
 - Etc.
- Ask them to mark their 3 most remarkable learning experiences on the timeline.
- As a warm-up, encourage them to see if they can write a list of 3-4 soft skills they think might be relevant to each of these 3 experiences.
- Ask them to explore one of the experiences more deeply in the SkillMill app. Depending on how much time is available, they can choose the "Open Path" (paper plane symbol) to explore all Big9 skill categories, or choose to look at the experience from the perspective of a single skill only, in the "Guided Path" (compass symbol).
- Towards the end of this exercise, the students will use the CAR (Context, Action, Result) model to try to write a short story about their experience.

Reflection in pairs:

- Students are encouraged to share their story in pairs, about the soft skills they have gained or trained during these remarkable learning experiences.
- Use for example menti.com (or similar virtual platform or white board) and ask the students to enter the page and complete the following exercise: “Please write your most important soft skill/s gained or trained during your chosen experiences”. This allows the students to see the results of the others’ reflections.
- End the session with a group discussion covering the process of reflection. How did it go? What did they experience? What was challenging? What have they discovered about themselves? What would be their key takeaway from this workshop?

At the very end of the workshop, encourage the students to use the SkillMill app to continue the process of reflecting on soft skills during their upcoming international experiences. This exercise provides context to the guiding principles that drive the exercises in the app.

Workshop option 2) Unwrapping skills through storytelling

This workshop is most suited to when students are returning from a study abroad experience. Approximately 2 hours will be needed for this session.

Before the workshop:

The students are asked to find examples of at least two remarkable or memorable experiences from their study abroad experience. The students should be encouraged to process their experiences using the SkillMill app even before the workshop.

During the workshop, in smaller groups of 3-4 students:

- In the small groups, each participant will choose one of their stories of an experience that happened during their study abroad, and share their story with the rest of the group.
- The students are then asked to individually use the SkillMill app to reflect more deeply on their chosen experience. They can either explore all Big9 skill categories in the “Open Flow” (paper plane symbol), or start with a specific skill to find a connected experience in the “Guided Flow” (compass symbol).
- Toward the end of the exercise, they are encouraged to use the CAR (Context, Action, Result) model in the app, to create a short story. This model combines their initial experience with the results from the reflections, by first introducing the context and setting of the experience, followed by the actual actions they took, and finally verbalising the results of their actions (such as lessons learned and skills gained).
- The students then take turns telling their stories. The other group members will give feedback after listening to each individual story. The feedback should focus on e.g. identifying new soft skills from the story, since many experiences can relate to

different skills. The students learn from each other's stories and can in that way identify more "hidden" soft skills.

- The participants can be asked to write down the skills extracted from the stories either on paper or on a virtual platform/white board.

End of the workshop (with the whole group):

- After the story telling session in small groups, the students are given the opportunity to share their thoughts and feelings with the whole group. In this collective session students are guided how to reframe their international experiences into skills that are valued in working life.
- The students are then guided to **practice their stories again** using the CAR- model. This time with focus on formulating them so that they can be used for job hunting purposes, for example in a CV or cover letter.
- To wrap up the workshop, the students are asked to formulate a one minute elevator pitch about the international experience. They pitch to each other, in pairs, based on the learnings from the workshop. The pitch should answer the question "What did I learn during my international experience?" and can be built around points such as:
 - When I was abroad, I learned...
 - The main takeaways from my international experience are...
 - While I was abroad, I trained skills such as...
 - In my future career, I would like to use these skills...

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Appendix 1: The Big9 Skills Framework

Big9 Skill	Sub-skill	Description
<p>DECISION-MAKING</p> <p><i>The ability to evaluate a situation and its potential risks and benefits, and choose the best course of action.</i></p>	Consequence analysis	<i>Using logic to identify the strengths and weaknesses of alternative solutions.</i>
	Risk assessment	<i>Identifying the level of risk involved in a situation.</i>
	Situation analysis	<i>Looking at different sides of a situation in order to understand it.</i>
	Information-gathering	<i>Gathering information from different sources in order to help us make a good choice.</i>
	Conscious choice	<i>Being aware of different options, and understanding why we choose a certain option.</i>
	Resource management	<i>Gathering and using resources (like time and money) strategically.</i>
	Planning	<i>Figuring out the steps you need to take in order to reach your goal.</i>
<p>CRITICAL THINKING</p> <p><i>The ability to question information and consider perspectives and agendas of different information sources (including oneself).</i></p>	Open-minded thinking	<i>Being willing to consider ideas and opinions that are new or different to your own.</i>
	Asking questions	<i>Asking appropriate questions to gain a better understanding.</i>
	Analytical thinking	<i>Looking at complex ideas in a systematic way.</i>
	Pattern identification / Systems thinking	<i>Seeing beyond details to find patterns and realise how things work together.</i>
	Information literacy	<i>Having the ability to process information from different sources.</i>
	Critical questioning	<i>Readiness to carefully question a subject or idea.</i>
<p>PROBLEM SOLVING</p>	Identifying challenges	<i>Identifying and sorting out the many faces of the problem.</i>
	Prioritising	<i>Choosing the order in which issues are dealt with.</i>

<p><i>The ability to understand the underlying dynamics behind a problem and applying the right actions to solve it.</i></p>	Solutions-oriented thinking	<i>Focusing on finding possible solutions rather than "getting stuck" on the problem.</i>
	Understanding and responding to counterparts	<i>Considering other peoples' perspectives in order to solve a problem.</i>
	Coping skills	<i>Reducing stress by dealing with the feelings (e.g. through positive thinking or social support), or by solving the causes of stress.</i>
	Recognizing opportunities	<i>Discovering useful ideas or possibilities to solve a problem.</i>
<p>COMMUNICATION</p> <p><i>The ability to effectively transmit and receive written, spoken, and non-verbal information with a minimum of misunderstanding.</i></p>	Non-verbal communication	<i>Nonverbal communication is interacting with others and sharing information through the use of body language including eye contact, facial expressions, gestures etc.</i>
	Active listening	<i>Focusing completely on a speaker, understanding their message, comprehending the information and responding thoughtfully.</i>
	Clear written expression	<i>Communicating ideas and information in writing in a clear and effective way to ensure that information and messages are understood.</i>
	Clear verbal expression	<i>Communicating ideas and information verbally in a clear and effective way to ensure that information and messages are understood.</i>
	Proactive communication	<i>Preventing issues and problems by communicating openly.</i>
	Teaching & Training	<i>Facilitating the learning process of others. Supporting and coaching individuals and/or groups in gaining skills and knowledge.</i>
	Giving constructive feedback	<i>Providing respectful, clear and consistent feedback on the performance or actions of others. Assessing achievements as well as mistakes in order to find room for improvement.</i>
	Diplomatic sensitivity	<i>Knowing what to say and how to say it without causing offence.</i>
	Public speaking	<i>Presenting material to an audience, for example to provide information or inspire.</i>

	Persuasion & Negotiation	<i>Sharing ideas in order to enable opposing sides to resolve disputes and reach agreement. Ability to convince others to change their mind.</i>
	Adaptive communication	<i>Adjusting one's communication (content or style) so it fits others.</i>
<p>TEAMWORK & LEADERSHIP</p> <p><i>The ability to effectively work with other people towards a common goal - either as equal partners or by leading and coordinating others.</i></p>	Encouraging participation	<i>Encouraging even the less active/vocal group members to participate.</i>
	Leading & coordinating	<i>Coordinating the work of others, delegating tasks, giving guidance and directions. Motivating others to give their best, supporting them to develop their strengths and skills.</i>
	Supporting team members	<i>Supporting people you cooperate with by offering help or assistance.</i>
	Building trust	<i>Developing trust between people so that they can work together more effectively.</i>
	Working in diverse groups	<i>Cooperating with people from different cultures, personalities or perspectives.</i>
	Collaboration	<i>Working in a group towards a shared goal, being considerate of the roles and competencies of other team members.</i>
	<p>INTERPERSONAL RELATIONSHIPS</p> <p><i>The ability to relate positively to other people through emotional awareness and perceptiveness towards emotions, cultures, and rules.</i></p>	Etiquette & professionalism
Managing disagreements		<i>Addressing differences and finding common ground that enables everyone to work together peacefully.</i>
Empathy & perspective-taking		<i>Being considerate of other people's needs and feelings.</i>
Cultural sensitivity		<i>Being aware and accepting that cultural differences and similarities between people exist.</i>
Building relationships across cultures		<i>Having a willingness to get acquainted and socialise with people from different cultures.</i>
	Learning from experience	<i>Analysing learning outcomes from an experience</i>

<p>ADAPTABILITY & FLEXIBILITY</p> <p><i>The ability to effectively adapt to changing surroundings. This includes both openness to new experiences, understanding situations, and adapting your behaviour accordingly.</i></p>	Openness to new experiences	<i>Being open minded towards new experiences and dealing well with the unforeseen.</i>
	Accepting constructive criticism	<i>Considering well-reasoned opinions about one's work in a positive manner.</i>
	Adapting to new circumstances	<i>Changing one's attitude to suit new situations.</i>
	Tolerating other perspectives	<i>Willingness to accept behaviour and beliefs that are different from your own (even when you do not agree with them).</i>
	Accepting change	<i>Tolerating changing circumstances.</i>
	Tolerance towards uncertainty	<i>Managing unexpected and unpredictable situations in a constructive way.</i>
	Accepting difference	<i>Tolerating unchangeable differences.</i>
	Willingness to learn	<i>Showing a positive attitude towards new knowledge and skills.</i>
Cultural awareness	<i>Understanding there are different cultural perspectives.</i>	
<p>SELF-MANAGEMENT</p> <p><i>Respecting your own needs and understanding your strengths and weaknesses. E.g., discipline, prioritizing, goal-setting, and working hard, but also taking care of yourself.</i></p>	Resilience / Cope with pressure	<i>Ability to handle changes and recover from set-backs.</i>
	Time-management	<i>Organising one's own time to be able to deliver.</i>
	Asking for help and support	<i>Understanding the need for advice from others to better manage one's tasks.</i>
	Organisational skills	<i>Managing your time, energy and workspace well and getting your work done successfully.</i>
	Openness to challenges	<i>Being curious to new and challenging experiences</i>
	Self-awareness	<i>Being aware of one's own values and interests and mindset.</i>
	Working independently	<i>Performing your tasks self-disciplined, reliable and goal-oriented.</i>

	Assuming responsibility	<i>Taking responsibility for your own activities.</i>
	Continuous learning	<i>Being positive towards new challenges that require us to learn new things.</i>
	Stress management	<i>Dealing with highly stressful situations by communicating calmly and remaining level headed when making decisions.</i>
	Delegating	<i>Sharing or transferring responsibilities</i>
	Multi-tasking	<i>Handling more than one task at the time</i>
<p style="text-align: center;">CREATIVITY</p> <p><i>Think outside of the box, find unexpected methods, and see opportunities in adversity. Creativity is the willingness to seek knowledge in new places, create freely and apply resources unexpectedly.</i></p>	Resourcefulness	<i>Finding ways to use resources in unexpected ways.</i>
	Curiosity	<i>Openness to exploring and discovering new experiences.</i>
	Outside-of-the-box thinking	<i>Presenting unusual, creative or clever ideas about a given topic to solve a situation.</i>
	Initiative	<i>Having the capacity to act independently without being told.</i>
	Innovation	<i>Thinking of new ideas and solutions by combining information from different perspectives.</i>